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Determination of some parameters of a porous medium-liquid system by the pulsed field gradient NMR

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Abstract

A possibility was considered to estimate the parameter of a porous medium S/Vp, where S and Vp are the surface area and the volume of pores, respectively, as well as the power of nuclear magnetic energy sinks ρ of a porous medium-liquid system by the example of randomly packed glass spheres 53-63 μm in diameter and acetone, water, or decane as a liquid medium. Estimates were made by analyzing the time dependences of the effective self-diffusion coefficient D(t) and P(t), the probability of return of a molecule to its initial position by time t. It was shown that the short-time parts of D(t) dependence allow us to obtain parameters S/Vp and ρ, whereas those of P(t), only the S/Vp, parameter. The values of ρ, obtained from D(t), and from the time of relaxation of longitudinal nuclear magnetization, differ from each other by an order of magnitude. As expected, the value of S/Vp, obtained for a given porous medium, is independent of the nature of introduced liquid.

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